

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Appln. No. 09/937,220
Attorney Docket No.: Q65416

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An electric power unit for electric discharge surface treatment by which electric discharge is generated between an electrode for electric discharge surface treatment and a workpiece so that a hard coat is formed on a surface of the workpiece by the energy of electric discharge, comprising:
an electric discharge current pulse control unit which sets a first pulse width with a first peak value, a second pulse width with a second peak value, ..., and an n-th pulse width with an n-th peak value (where n is an integer equal to 2 or more), said control unit setting the first pulse width and the first peak value so that an electric current density between the electrodes is in a predetermined range which suppresses emission of electrode material, so that during a period of the first pulse width a diameter of an electric discharge arc column is extended, and setting the k-th pulse width and the k-th peak value ($2 \leq k \leq n$, k is an integer) so that a quantity of supply of hard coat material by the emission of electrode material is a predetermined value determined according to a predetermined processing condition.

2. (currently amended): A method of electric discharge surface treatment for forming a hard coat on a surface of a workpiece by which electric discharge is generated between an

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electrode for electric discharge surface treatment and the workpiece so that the hard coat is formed on the surface of the workpiece, comprising the steps of:

generating an electric discharge pulse current having a first pulse width with a first peak value, a second pulse width with a second peak value, . . . , and an n-th pulse width with an n-th peak value (n is an integer equal to 2 and more);

setting the first pulse width and the first peak value so that an electric current density between the electrodes is in a predetermined range which suppresses emission of electrode material, and so that during a period of the first pulse width a diameter of an electric discharge arc column is extended; and

setting the k-th pulse width and the k-th peak value ($2 \leq k \leq n$, k is an integer) so that a quantity of supply of hard coat material by the emission of electrode material is controlled to a predetermined value determined according to a predetermined processing condition.

3. (currently amended): A method of electric discharge surface treatment for forming a hard coat on a surface of a workpiece by which electric discharge is generated between an electrode for electric discharge surface treatment and the workpiece so that the hard coat is formed on the surface of the workpiece, comprising the steps of:

generating an electric discharge pulse current having a first pulse width with a first peak value, a second pulse width with a second peak value, . . . , and an n-th pulse width with an n-th peak value (n is an integer equal to 2 and more);

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setting the first pulse width and the first peak value so that an electric current density between the electrodes is in a predetermined range which suppresses emission of electrode material, and

setting the k-th pulse width and the k-th peak value ($2 \leq k \leq n$, k is an integer) so that an amount of hard coat material supplied to a space between the electrode and the workpiece is controllably increased to a predetermined appropriate quantity for formation of said hard coat.

4. (currently amended): The electric power unit for electric discharge surface treatment according to claim 1, wherein consumption of the electrode material for forming the hard coat on the surface of the workpiece is decreased by the control means-unit setting the k-th pulse width and k-th peak value.

5. (currently amended): The electric power unit for electric discharge surface treatment according to claim 1, wherein the control means-unit determines the predetermined value of the quantity of supply of hard coat material by the emission of electrode material according to the predetermined processing condition by controllably setting only the k-th pulse width.